NMR&D News

Navy Medicine Research and Development

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BRAC Construction for BHT and TSRL Buildings on Schedule

By CAPT Vincent DeInnocentiis
Commanding Officer, NAMRU-SA

Construction of the future homes of the Naval Medical Research Unit San Antonio (NAMRU-SA) is underway and remains on schedule at Fort Sam Houston, Texas.

The Joint Center of Excellence for Battlefield Health and Trauma Research (BHT) building will provide a 133,100 square-foot, three-story facility that will house NAMRU-SA's dental and combat casualty care research along with the Army and Air Force research components. BHT construction began in January 2008 and the Beneficial Occupancy Date (BOD) is scheduled for March 2010. The BOD is the date when construction will be completed and the building will be turned over to the government for occupancy.

BHT building

The Tri-Service Research Laboratory (TSRL) is a 181,620 square-foot, single-story facility to be constructed on a 25-acre site at Fort Sam Houston. Slated for completion in March 2011, this facility will be designed and constructed to include energy-efficient features such as natural lighting, high-efficiency chilled water systems, and energy recovery systems, and is expected to achieve a Leadership in Energy and Environmental Design (LEED®) Silver rating.

The TSRL facility will primarily house two research entities - the Directed Energy research portion of NAMRU-SA and the Air Force Research Laboratory Directed Energy research group. This four-acre building will consolidate interdisciplinary research on the health and safety aspects of radio frequency, laser and combined stressors.

Part of the TSRL project includes a bridge (W.W. White Road Bridge) that provides all-weather access (the area is prone to flooding) and will ensure emergency vehicle access from the main post to the TSRL lab. The bridge was completed ahead of schedule and is now in use.

TSRL building site

At this time, the BHT is on schedule for occupancy in March 2010 by the dental and combat casualty care research units. The TSRL, although more than a year and half away from completion, is well on its way to becoming a spectacular feat of engineering, being both energy efficient and environmentally friendly.

An artist's rendition of the TSRL facility

NMRC Scientists Study Healing Process in Traumatic Wounds

By CDR Eric Elster
Senior Staff Scientist, NMRC
Regenerative Medicine Department

As part of a translational research program, scientists in the Naval Medical Research Center's Regenerative Medicine Department have determined that the ability of injured Soldiers and Marines to heal traumatic wounds is part of their immune systems response. They have implemented a bench-to-bedside approach that has determined the relationship between systemic inflammation and the development of trauma-related disease states such as wound failure, abnormal bone formation (Heterotopic Ossifications - HO) and wound infection in injured warfighters. This work has been the result of a well-orchestrated, collaborative effort among the National Naval Medical Center, the Walter Reed Army Medical Center, the Walter Reed Army Institute of Research, and the Uniformed Services University of the Health Sciences with contributions from scientists, surgeons and trainees.

In a paper recently published in the Annals of Surgery, the study's authors demonstrate that both local and systemic cytokines, molecules that allow cells to communicate with one another, are elevated in the wounds and blood of patients whose wounds have not healed when compared to those in which wounds heal in a timely fashion. While the majority (70 percent) of traumatic wounds studied that were closed by surgical methods healed normally, wounds that did not were associated with increased levels of these inflammatory biomarkers and occurred in patients that were more

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Commanding Officer's Message

Researchers, Support Staff and Stakeholders of Navy Medical Research, Development, Testing and Evaluation (NMRDT&E):

Life is a journey and education is life-long. I use education in the broad sense and I definitely include training in that definition. Those of us in uniform and government civilians accept it as the cost of doing business, but in a larger sense it addresses cost avoidances, for it could surely cost us much more in terms of efficiency and lost opportunities if we failed to perform our assigned duties out of ignorance. Much of our training is mandated, but beyond that training provides us with skills to do our jobs safely and more efficiently. I encourage all employees to seek out education and training opportunities to further their knowledge and increase job performance.

A very interesting article on regenerative medicine conducted in our Operational and Undersea Medicine Directorate and funded entirely by the Navy Bureau of Medicine and Surgery Advanced Development Program appears in this issue. In a bench-to-bedside approach, our Navy researchers in a collaborative study have described a relationship between systemic inflammation and trauma-related disease states. Inflammatory biomolecular markers are elevated in wounds and blood of patients whose wounds have not healed. Analyses of these biomarkers suggest the possibility of predicting wound closure timing. This work will inform future therapeutic options.

One of the highlights of the month was the visit to NMRC by our new flag officer, RDML Eleanor Valentin, Senior Health Care Executive, USN. It was her first opportunity to meet our staff and to be briefed on our biomedical research efforts here and throughout our Medical R&D enterprise. I know she looks forward to visiting our other laboratories and returning to NMRC.

On October 14, I was able to participate in the celebration of our diversity for National Hispanic Heritage month with our Army colleagues here at NMRC/WRAIR. It was very well done and we shared in fellowship Latin culture, including several dance styles and an array of food dishes from several Central and South American countries.

I had the opportunity to visit the Naval Submarine Medical Research Laboratory recently and was impressed by the broad scope of work being done by such a small staff. This is truly a unique Navy resource for human performance research within DoD addressing the needs of not only our submariners, but also the surface fleet, Army, Coast Guard and Special Forces.

In this issue of our newsletter, we highlight another one of Navy Medicine's great success stories, the Naval Medical Research Center Detachment in Lima, Peru. Opened in 1982 as the Naval Medical Research Institute Detachment under CAPT Michael Kilpatrick, MC, USN, it has grown to become one of the largest OCONUS operations, with over 300 staff under the leadership of CDR John Sanders, MC, USN. We are proud of the achievements of this detachment for its contributions to our understanding of diseases like Dengue Fever and for all the nation building it performs in the form of training new Peruvian physicians and scientists. I hope you enjoy reading about NMRDT&E.

Lastly, one of the more enjoyable activities that a CO gets to do is to host award ceremonies. In October, we had a number of civilian awards and numerous military medals . I would like to point out one in particular - Ms. Aletha Holser, NMRC Librarian, received her 25-year service award. I was honored to recognize all the recipients and I am especially proud of our community outreach by our staff that participated in a Habitat for Humanity Project in Washington, D.C.

Commanding Officer sends,
Richard L. Haberberger, Jr.
CAPT, MSC, USN

Traumatic Wounds

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severely injured. By analyzing these biomarkers, the authors have shown the possibility of predicting which wounds can be closed sooner than current treatment indicates and are in the process of testing this approach in an upcoming prospective clinical trial.

With regard to HO, these efforts have characterized the scope of the disease in retrospective clinical studies and gone on to determine the role of systemic and local inflammation using molecular markers and gene expression profiles in prospective studies. The program is currently evaluating the ability of the effluent from combat-related wounds to contribute to HO formation *in vitro* and is designing a prospective trial to evaluate therapeutic prophylaxis for HO. By fully characterizing the biology of HO development, the goal is to develop prognostic assays for HO and direct future therapeutic options not only to treat HO but also to prevent its formation, thereby removing a major obstacle to recovery in injured warfighters. These efforts have the potential to reduce lengths of hospital stay, decrease costs, and return injured Soldiers and Marines to duty earlier. This study was funded entirely by the U.S. Navy (BUMED Advanced Development Program).

RDML Valentin Tours NMRC, Meets Staff

RDML Eleanor Valentin, Senior Health Care Executive, USN, Commander of the Navy Medicine Support Command and Chief of the Medical Service Corps, visited the Naval Medical Research Center (NMRC) on October 2. Her day included meetings with NMRC Commanding Officer CAPT Richard Haberberger, Jr. and Executive Office CAPT Eileen Villasante, briefings on the research being conducted within NMRC's several directorates, a tour of the facility and its laboratories, and a meeting with NMRC's enlisted personnel.

Photos by Andrew Brown

LT Mario Guerrero shows RDML Valentin a hand-held assay for biowarfare agents

CDR Kyle Petersen, Assistant Director of NMRC's Undersea Medicine Division, gives RDML Valentin a tour of the undersea medicine research facility

RDML Valentin and CAPT Haberberger talk with HM1 Joel Tisuela, HM2 Stephen Petzinger, HM2 Timothy Velasco, and HMC Jesse King

RDML Valentin, CAPT Villasante, CAPT Haberberger, William Lorenzen, and Jerry Morris watch as Dr. Keith Prusaczyk describes the MOVES3 device

NAMRU-3 Staff Helps to Implement Joint Biological Agent Identification and Diagnostic System at Combat Support Hospitals

By Darnell Gardner
NAMRU-3 Technical Writer

The battle against the highly infectious pandemic H1N1/2009 virus has taken a turn for the better with the inception of the Joint Biological Agent Identification and Diagnostic System (JBAIDS) in U.S. Central Command (CENTCOM) laboratories. Naval Medical Research Unit No. 3 (NAMRU-3), along with full support from the Department of Defense (DoD) Global Emerging Infections Surveillance System (GEIS) and the Chemical Biological Medical Systems (CBMS) Joint Project, now commands the know-how and means to project real-time pandemic H1N1/2009 diagnostic capability to the CENTCOM and U.S. Africa Command Areas of Responsibility.

The enactment of the Food and Drug Administration Emergency Use Authorization to use the Centers for Disease Control H1N1 real-time polymerase chain reaction (PCR) diagnostic kit, granted in August 2009, allowed NAMRU-3 researchers to be certified and serve as regional JBAIDS trainers for real-time detection of the pandemic H1N1/2009 influenza virus. On a short timeframe, LCDR Guillermo Pimentel, Deputy Department Head, Virology and Zoonotic Disease Prevention, coordinated efforts to deploy LCDR David Rockabrand, LT Brent House, and Drs. Jolanta Jacobs and Jeff Villinski to Craig Joint Theater Hospital, Baghram Air Base, Afghanistan; 332 Expeditionary Medical Group (EMDG), Joint Base Balad, Iraq; 379 EMDG, Al Udeid, Qatar; 10 Combat Support Hospital, Baghdad, Iraq; and Camp Buehring, Kuwait to provide JBAIDS training. To date, fifteen laboratory medical personnel have been certified as users.

JBAIDS was employed to stand in for the Applied Bio-systems 7500 FAST Real-Time PCR System, a more sensitive PCR instrument, yet not readily available in warring locations to confirm influenza cases. Upon implementation of the JBAIDS, combat field clinics will possess the means to clinically diagnose pandemic H1N1/2009 influenza from patients presenting with influenza-like illnesses. JBAIDS promises to be a significant advantage to the combat zone due to its versatility and portability. Continued collaborations between NAMRU-3, DoD-GEIS, and CMBS will ensure that JBAIDS use thrives in and out of the battlefield. As a result of JBAIDS, CENTCOM is now equipped with in-theater diagnostic capacity for this influenza virus.

CAPT Patrick Cutter, COL Richard McBride, Dr. Jolanta Jacobs, LT Brent House, and SrA Timothy McCallum at Baghram Air Base, Afghanistan

Navy Medical Researchers Report Breakthroughs for Vaccines Against Foodborne Illnesses at International Meeting

By CAPT Stephen J. Savarino
Director, NMRC Enteric Diseases Dept.

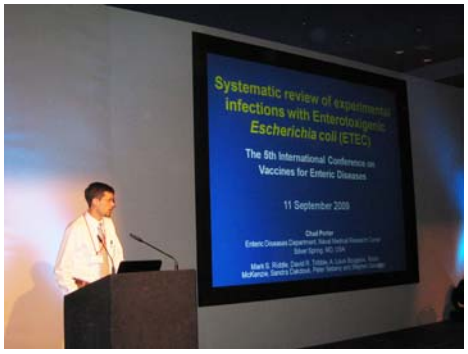
At the Fifth International Conference on Vaccines for Enteric Diseases, held in Spain on September 9-11, 2009, Navy medical researchers and their partners reported important advances in the battle to prevent foodborne illnesses, a high-impact military and global public health problem. The Naval Medical Research Center's (NMRC's) Enteric Diseases Department, the Bacteriology Department of the Naval Medical Research Center Detachment (NMRCD), and the Clinical Trials and Military Studies Department from Naval Medical Research Unit No. 3 (NAMRU-3), along with their Army and academic collaborators, gave eight platform talks and three poster presentations. The Navy reported new findings from bacterial dysentery and diarrhea vaccine development efforts, epidemiological studies that have informed the development of enteric vaccines, and the refinement of new tools for vaccine evaluation.

One platform talk described findings from a Phase 2 clinical trial of a non-living subcellular vaccine against shigellosis. This candidate vaccine was developed by the U.S. Army and brought through early Phase 1 and 2 clinical trials by a Navy-Johns Hopkins University clinical research team led by CDR Mark Riddle and Dr. Clayton Harro. The vaccine did not confer protection to vaccinees upon subsequent challenge with wild type *Shigella*, but the lessons learned are informing plans for future development of a *Shigella* dysentery vaccine.

A podium and poster presentation described different aspects of a new *Campylobacter jejuni* volunteer challenge model that is being developed by NMRC investigators in conjunction with an academic partner at the University of Vermont (UVM) as a tool for assessment of candidate *Campylobacter* vaccines. The two presentations, one given by UVM clinical investigator Dr. Beth Kirkpatrick and the other by NMRC researcher Dr. Shahida Baqar, described clinical and immunological findings from testing of a new *C. jejuni* strain in volunteer participants.

Dr. Patricia Guerry spoke on considerations that will be important in taking a promising new conjugate vaccine against *C. jejuni* from 'prototype' monovalent vaccine to a broadly protective multivalent vaccine, concluding that this pathway will pose challenges but is feasible.

Lastly, Ms. Sandra Isidean and Mr. Chad Porter of NMRC and Ms. Gladys Nunez of NMRCD presented various aspects of research that is helping to shape the necessary constituents and tools for a new vaccine against enterotoxigenic *Escherichia coli* (ETEC). This pathogen was first recognized as a military scourge during the Vietnam War and continues to cause the majority of diarrheal episodes for U.S. service personnel on deployment.



Mr. Chad Porter reviewing DoD vaccines at the international VED meeting
Photo by CDR Mark Riddle

NMRC Celebrates Hispanic Heritage with Music, Dance, Food

By LTJG Amanda Gardner
NMRC Administrative Officer

The Naval Medical Research Center and Walter Reed Army Institute of Research Multi-Cultural Committee put together another successful celebration in honor of Hispanic Heritage Month. NMRC's Commanding Officer, CAPT Richard Haberberger, Jr. opened the celebration with inspirational remarks, followed by a brief speech from LT Mario Guerrero describing his Hispanic heritage. The crowd received quite a surprise as Chief Justice Sonia Sotomayor, portrayed by an Army NCO, entered the auditorium to talk about the trials and tribulations she went through in order to achieve success.

Araceli and Antonio of the Maru Montero Dance Company
Photo by Andrew Brown

Following Chief Justice Sotomayor's departure, a group of professional Spanish dancers from the Maru Montero Dance Company featuring Araceli and Antonio took center stage. The two entertained the crowd with their vibrant dance and were the perfect segue into the dance competition.

The Hispanic Heritage Celebration came to end as guests participated in a geography quiz and feasted on some fabulous Hispanic cuisine. The feast consisted of Salvadoran food prepared by Margaria Flores and Esperanza Diaz as well as food from the Dominican Republic prepared by Alta Gracias-Rojos, Alta Gracias-Santos, and Candida Rivas. No one left the celebration hungry; their entrees were a hit!

Hispanic Heritage Celebration 2009 was a rousing success. The bi-command Multi-Cultural Committee would like to extend their appreciation to all of the volunteers who made this a truly unforgettable event. Our next observance will be in November in honor of National American Indian Heritage Month.

NAMRU-3 Supports Multinational BrightStar Exercise

By Darnell Gardner
NAMRU-3 Technical Writer

BrightStar is a biennial, multi-national exercise held in Egypt that is designed to strengthen military-to-military relationships and improve readiness and interoperability among U.S., Egyptian and Coalition forces. The operation, co-sponsored by the U.S. and Egyptian militaries, took place during the month of October 2009 and included participants from the United States, Egypt, Turkey, Jordan, Kuwait, Greece, Italy, Germany, the United Kingdom, France and Pakistan. This year's participation was the largest in recent years, with nearly 4,000 total U.S. personnel participating over the two-phased evolution of the exercise.

The NAMRU-3 Clinical Trials and Military Studies (CTMS) Program, formerly the Enterics Diseases Research Program, has historically provided epidemiologic and laboratory support for diarrheal disease surveillance. This support continued for this year's exercise, with emphasis on providing real-time data for force health protection officers on pathogen-specific etiologies of diarrheal disease. In addition, NAMRU-3 is providing real-time surveillance and laboratory reporting on influenza-like illness. Due to the unique geopolitical climate of the region, NAMRU-3 has provided real-time surveillance and laboratory diagnosis of influenza, including seasonal influenza and pandemic H1N1. NAMRU-3 provides daily situational reports on samples collected and laboratory results, including 24-hour turnaround time for influenza diagnostics. This has proved to be invaluable to BrightStar military commanders working in an operational environment, particularly since diarrhea and respiratory illness are the top two illnesses next to injury that affect U.S. Soldiers in an overseas operational setting. As part of this support, NAMRU-3 staff provided training and briefings on the diagnosis and management of influenza and diarrheal disease for over 40 active duty and reservist health care providers.

LCDR Peter Sebeny, M.D. of NAMRU-3 briefs advance teams at the 2009 BrightStar exercise

NMRC Sailors Test Themselves at 2009 Wilderness Challenge

By LT Michael Prouty
Chairman, NMRC MWR Committee

This year, the Naval Medical Research Center (NMRC) and the Walter Reed Army Institute of Research (WRAIR) fielded two joint teams at the 2009 Wilderness Challenge sponsored by the Naval Weapons Station Yorktown Morale, Welfare and Recreation Committee. The first team consisted of CDR Cindy Tamminga (NMRC), SPC Josh Clayton (WRAIR), SPC Sean Reyes (WRAIR) and SPC Anthony Sturzl (WRAIR); the second team included LT Mike Prouty (NMRC), SSG Maria Kurtzweil (WRAIR), SGT Montrae Jemison (WRAIR) and HM2 Timothy Velasco (NMRC). The two-day event is open to all active duty military members and is currently in its ninth year.

Day 1 - Getting wet during the white water raft race

Teams of four members from all branches of service and bases throughout the United States converged on Fayetteville, West Virginia on October 8-10 to compete. The competition was held over two grueling days and tested a team's endurance in a variety of events. Day one began with an 8-kilometer mountain run, which was followed by a white water raft race on the Gauley River that included navigating class V rapids. Day two of the event was a continuous event beginning in the morning with a 10-mile mountain bike race. Teams then found themselves at the banks of the New River, where they climbed into two-person inflatable kayaks for an 8-mile race battling class I-III rapids. Following the river race, teams had to carry their kayaks up the hillside to the transition point where they dried off and began a 15-mile mountain hike race.

Over the two-day period, teams traveled a total of 50.1 miles through the West Virginia wilderness. Merely completing this event is a momentous task and all teams that finished received a command coin to commemorate the occasion. Both of the NMRC/WRAIR teams completed the event in respectable times and earned their coins.

If you are interested in competing next year, keep an eye out for announcements next summer. To learn more about the Wilderness Challenge, visit www.wildernesschallenge.net.

Photos by Mark Piggott, Public Affairs Officer, NWSYorktown

Day 2 - HM2 Timothy Velasco meets the challenge of the mountain bike race

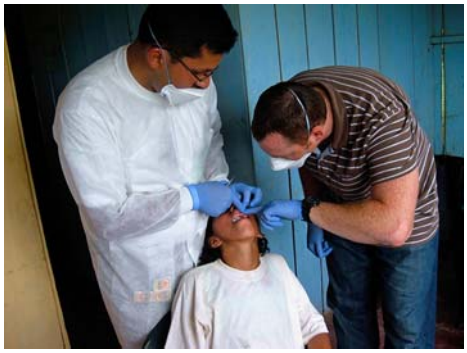
News from the Laboratories

NMRCD - Peru: A Long History of Military-to-Military Collaboration

By LT Jeremy Westcott
NRMCD Administrative Officer

The Naval Medical Research Center Detachment (NMRCD) - Peru has a long tradition of collaborations with the Peruvian military. This tradition started with NMRCD's founding in 1983 as a cooperative medical research agreement between the Surgeons General of the Peruvian and the U.S. Navies. NMRCD's laboratories in Lima and Iquitos are on the grounds of Peruvian Naval bases. This close relationship has expanded over the ensuing years to become a model of inter-military cooperation.

Some notable recent projects exemplify NMRCD's commitment to collaborative military-to-military work. In 2001, an outbreak of *Plasmodium falciparum* malaria in the El Alamo naval base on the Colombian border led to the development of an electronic-based infectious disease surveillance system called ALERTA. The project was a joint effort with the Peruvian Navy and was quickly adopted by the Peruvian Army. The system is closely monitored and modified by personnel at NMRCD. The system is used to establish baselines and detect outbreaks in military populations and provides near real-time access to data. More recently, the highly successful system has been expanded to the Peruvian Air Force and the Ecuadorian armed forces.



LT Manuel Larru and USUHS student, ENS Kenneth Bull, examine a patient outside Iquitos, Peru

NMRCD recently received an award from the Peruvian armed forces for the laboratory's work conducting human immunodeficiency virus (HIV)/sexually transmitted disease (STD) training, prevention and voluntary HIV testing at military and national police sites throughout Peru. Funded by the Department of Defense HIV/AIDS Prevention Program, this effort further strengthened the close ties between NMRCD and the Peruvian military.

NMRCD's collaborative efforts are not restricted to Peru. The laboratory is conducting surveillance and providing prevention training on infectious diseases for the Ecuadorian Navy and Army. In the future, projects are planned with the militaries of Colombia, Paraguay and Uruguay on febrile illness and STD monitoring, training and prevention.

NMRCD annually hosts a Peruvian Navy physician or dentist to conduct surveillance and research as part of the staff. Our current researcher, LT Manuel Larru, recently volunteered as an instructor at the Military Tropical Medicine Field Mission in the Peruvian Amazon. LT Jeffree Tovar, a Peruvian Navy physician who previously worked on the staff of NRMCD, is currently working on a Master of Public Health degree at the Uniformed Services University of the Health Sciences.

NMRCD staff with visiting Ecuadorian Naval officers

Close military-to-military collaborations in South America have enhanced NMRCD's mission over the years. For this reason, inter-military cooperation will be a staple of NMRCD's operations for years to come.

Hail and Farewell

Farewell to **LCDR Steven Newell**, who is leaving NMRC for the Naval War College in Newport, Rhode Island.

Hail to **HM2 Reginald Bienaime**, who comes to NMRC from Naval Hospital Yokosuka, Japan; **HM1 Hector Cano**, who comes to NMRC from the National Naval Medical Center, Bethesda, Maryland; and **HM1 Joel Tisuela**, who comes to NMRC from Branch Medical Clinic, Iwakuni, Japan.

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Commanding Officer
CAPT Richard L. Haberberger, Jr.
Executive Officer
CAPT Eileen Villasante
DFA - Public Affairs
CDR Eric R. Hall
Editors
Soni Fitzhugh and Jan Helman